



## **WATER RESOURCES RESEARCH GRANT PROPOSAL**

**Project ID:** 2005MT60B

**Title:** STUDENT FELLOWSHIP: Relationships between flood frequency and riparian vegetation distribution in montane streams of western Montana

**Project Type:** Research

**Focus Categories:** Floods, Sediments, Ecology

**Keywords:** flood frequency, riparian vegetation

**Start Date:** 03/15/2005

**End Date:** 06/30/2006

**Federal Funds:** \$3,000

**Non-Federal Matching Funds:** \$0

**Congressional District:** At Large

**Principal Investigator:**

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### **Abstract**

Riparian communities are prominent features of landscape in the American West. In spite of their importance to both aquatic and terrestrial ecosystems, riparian areas have been subject to severe alteration. In the Rocky Mountain, the total area of the riparian zone was reduced to almost a half of the 1940 estimate (Mitsch and Gosselink 2000). Water withdrawal and flood peak attenuation pose additional problem for existing riparian communities, which is accentuated by natural decline in stream flows due to decreased precipitation and snow pack. The natural flow regime (Poff et al. 1997) has been increasingly recognized as one of the most important factors for maintenance and regeneration of riparian communities. Riparian plant species are distributed across stress gradients caused by physical disturbance and moisture availability. Flooding is the major disturbance mechanism, removing or damaging species established too low, creating substrates for establishment through deposition and scouring, increasing the water availability in the floodplain, and creating the anaerobic gradient. Thus, flood frequency is a major control on riparian species distribution.

Various models have been suggested riparian maintenance flows (flows needed to conserve riparian ecosystem structure and function) (Auble et al. 1994, Richter and Richter 2000), and there are some successful cases of the maintenance flow prescription (Rood et al. 2003). However, prescription of riparian maintenance flows requires knowledge of the interaction between flood frequency, floodplain topography and plant community structure and composition. Studies conducted along streams in other montane settings, specifically the Cascade Mountains of Oregon, have suggested that flood frequencies with recurrence intervals in the range 3 to 7 years are appropriate for riparian maintenance (Chapin et al., 2000). However, there are no similar data for forested riparian areas along streams on National Forest land in the northern Rocky Mountain region.

Results generated by this research will provide knowledge on riparian maintenance flows, preservation of plant species diversity, and floodplain and riparian zone restoration for riparian management.